



The manufacturer assumes no liability for incorrectly set or user defined parameters!

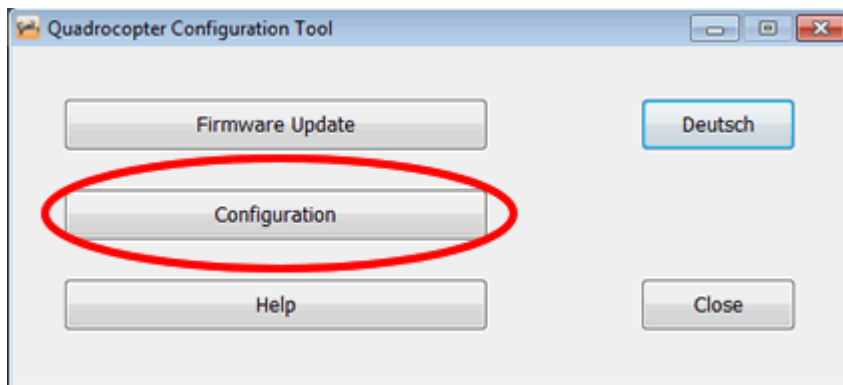
## 1. Introduction

The configuration tool helps the user to adapt the Quadrocopter behavior to his own needs. The program can

- make a firmware update that offers new flight features and fixes possible problems and
- change the flight parameter of the Quadrocopter to his own desires and transfer them to the hardware.

If there is a new firmware available, it can be found on the download site of the manufacturer. To communicate with the Quadrocopter, a serial connection must be established by using a interface cable, that is available seperately. Then the QudaroCopter should be brought to the bootloader mode. Details how to enter the bootloader are described in the user manual of the Quadrocopter. If the configuration tool is used for the first time, the correct serial interface should be set in the Configuration window.

You can open the configuration window by a click on "Configuration".



The specific possibilities of the configuration tool are explained in more detail in the next chapters.

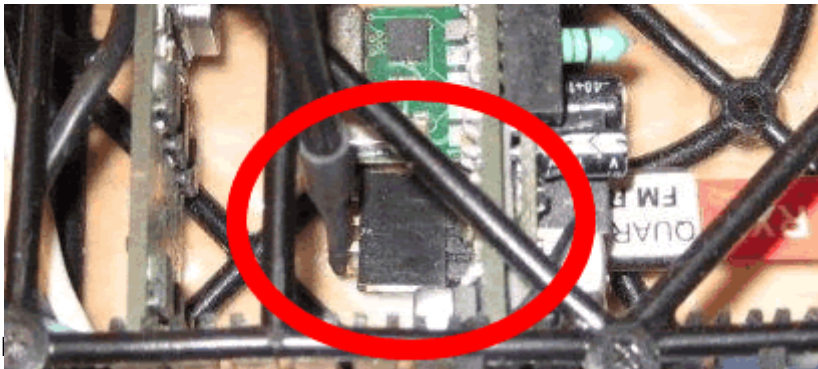
- [General Configuration](#)
- [Remote Control](#)
- [Flight Leveling](#)
- [Gas](#)
- [Firmware Update](#)

## 2. General Configuration

You can connect the Quadrocopter with the interface cable to the PC. Therefore you have to plug in the interface cable to the Quadrocopter like shown in the picture below. The USB connector type end of the cable is plugged into the USB interface on the PC.

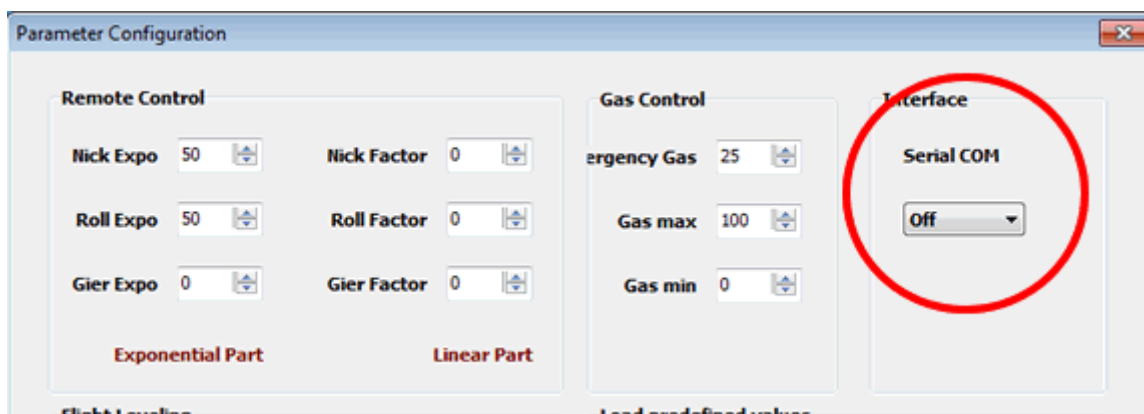


Take care about using the interface cable in the correct direction. Otherwise no communication can be established!



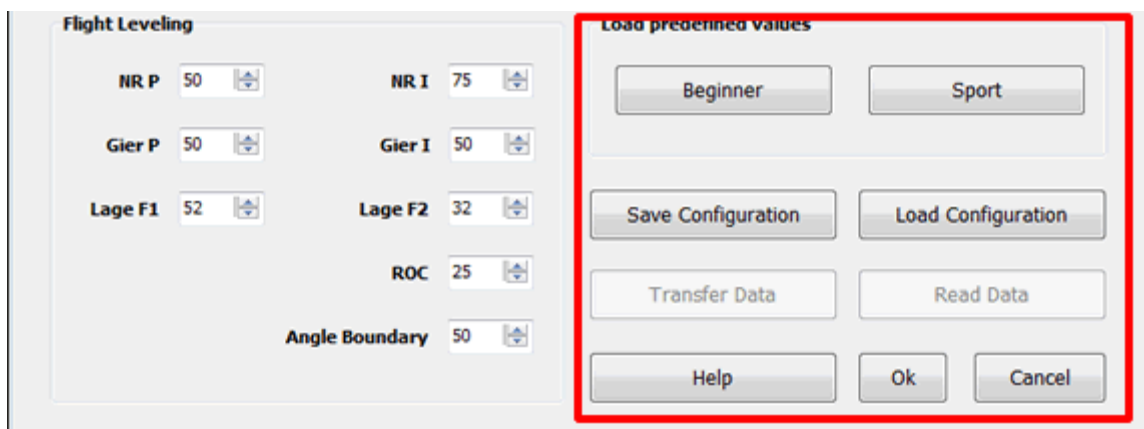
The power supply will be done via the interface cable, there is no need for a separate battery during configuration of the QuadroCopter. For establishing a connection between the QuadroCopter and the PC the QuadroCopter has to be brought in configuration mode. Please refer to the user manual for details.

Please select the appropriate serial interface in the configuration window after the interface cable is connected.



Picture 02: Serial interface

Now the actual configuration settings can be read from the QuadroCopter. Afterwards you can modify them and re-transmit them into the QuadroCopter. Please use the below shown buttons for this purpose.



Picture 03: Load settings etc.

- *Beginner*: Loads a predefined setting which can be used for beginners
- *Sport*: Loads a predefined setting which can be used for advanced pilots

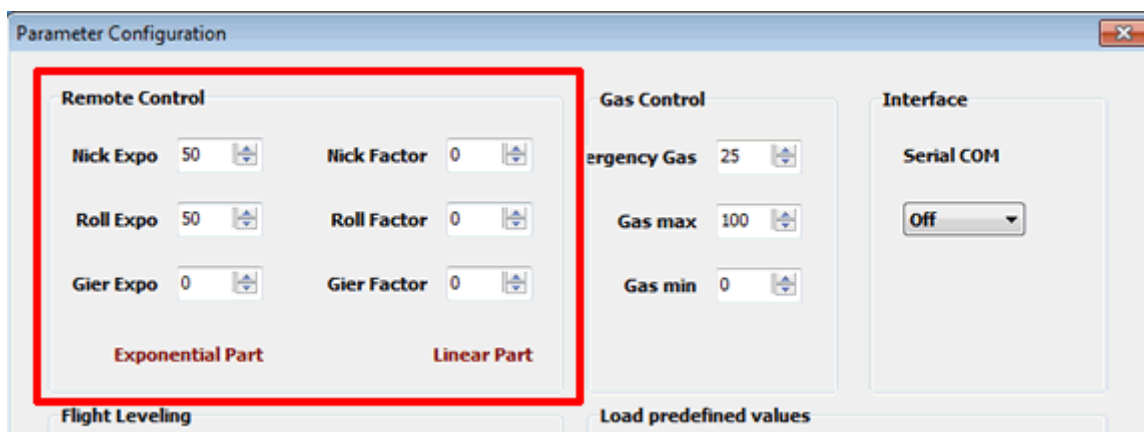


Depending on the jumper settings in the Quadrocopter a different set of Parameters will be used. To activate the user defined setting the specific jumper has to be set to the correct position. If data is read for the first time from the Quadrocopter the values can be out of accepted ranges.

- *Load Configuration*: Loads a previously saved setting from the PC
- *Save Configuration*: Saves the actual setting to the PC
- *Transfer Data*: Transfers the actual displayed setting to the Quadrocopter
- *Read Data*: Loads the actual setting from the Quadrocopter
- *OK*: Ends edit mode and keeps the displayed settings
- *Cancel*: Cancels the configuration

### 3. Remote Control

Parameter Expo and Factor for Nick, Roll and Gier



Picture 04: Settings for the remote control amplification

The Remote Control is sending a pulse width coded signal that is adapted to the value range  $-125/+125$ . These value can be modified to enable a specific adjustment between the movement of the stick and the flight reaction. With the utilization of an exponential function the steering does not react linear, but heavily damped in small stick movements.

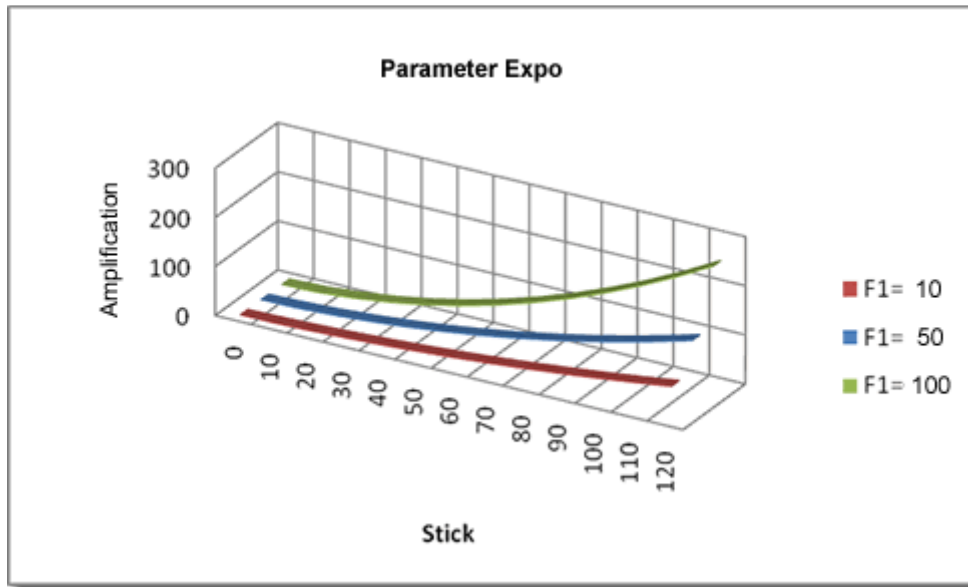
This setting is often used for Nick and Roll steering to achieve a more sensitive control of the flight axes. The two parameters (Expo and Factor) are used as factors for the settings.



Values can be entered between 0 and 100 (0% and 100%).

#### What is the effect of Expo?

The parameter Expo defines the exponential part of the behavior. it can be said in general that the higher this value, the more is the raising of the resulting exponential curve. This means less reaction on small stick movements, but more reaction on big movements with the control stick.

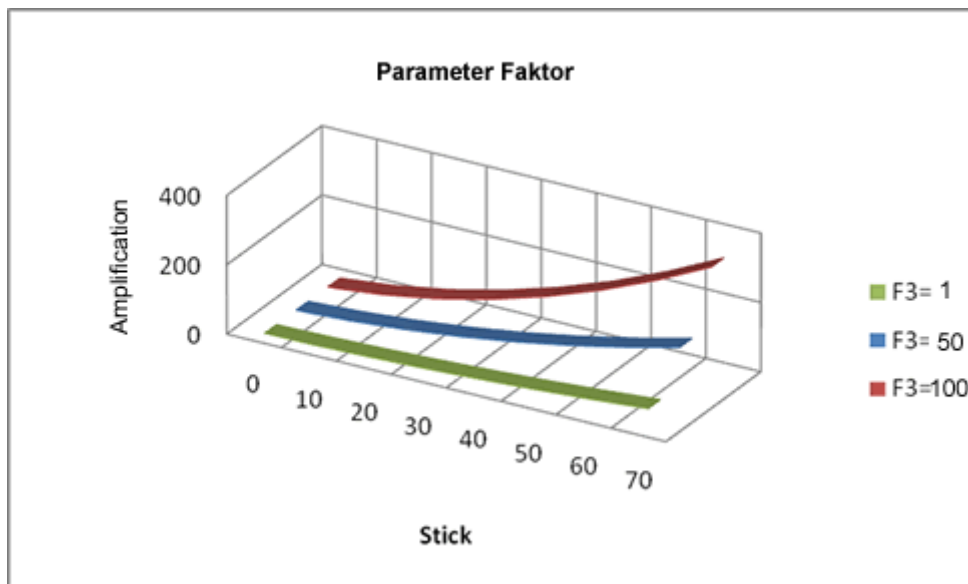


Picture 05: Expo - The lower Expo, the less bended the curve

A strong bended curve means less reaction on small stick movements, but very strong reactions on bigger stick movements.

#### What is the effect of Factor?

The parameter Factor is defining the linear amplification of the stick signal. By increasing this value the general amplification rate will also be increased. This will not effect the exponential part of the curve and this means the same effect independent from the stick movement.



Picture 06: Factor - linear amplification of the stick signal

## 4. Flight Leveling

The Quadrocopter has an automatic flight leveling system. This system determines the actual and the target position of the Quadrocopter, and then calculates the differences for the new engine parameters to compensate the divergence. The target position is given from the pilot through the remote control. The actual position is determined with three Gyro-Sensors and a Three-Axis Acceleration sensor. The behavior of the regulator is



defined through special parameters. Since these parameters intervene directly into the regulation, the use of improper values (combination of parameters) can lead to instable flight characteristics. Changes should be made subtle and tested intensively.

Picture 07: Flight leveling settings



Values can be entered between 0 and 100 (0% and 100%).

## **NR P is the proportional part of the Nick/Roll Axis**

This factor affects the strength how the regulator reacts on movements. The lower the value, the more direct reacts the Quadrocopter on changes.

## **NR I is the integral part of the Nick/Roll Axis**

This factor biases the temporal behavior of the regulator and the accuracy . The higher the value (in comparison to NR P), the lower is the dampening on changes. At an excessively high value the Quadrocopter tends to swing.

## **Gier P is the proportional part of the Yaw Axis**

This factor affects the strength how the regulator reacts on movements. The behavior is similar to the NR P parameter.

## **Gier I is the integral part of the Yaw Axis**

This factor biases the temporal behavior of the regulator and the accuracy. At a low value the Quadrocopter reacts damped on the Yaw-Axis.

## **Lage F1, Lage F2 (or Gyro Acc)**

The position detection is achieved with a Three-Axis Acceleration sensor. The earth gravitation is used as a reference. The target position for the Roll and the Nick axis is steered with the remote control. The position control has the job to steer the engines to reach the target position and to maintain a stable flight behavior. The factors Lage F1 , Lage F2 determine how strong the position difference influences the regulation and how fast the position correction is made.

## **ROC (rate of change)**

With this factor the rate of change (edge steepness) of the Gyro signal can be limited. At a small value the signal from the Gyro-Sensor is strong limited and the Quadrocopter reacts with a high delay on changes. At higher values the Quadrocopter reacts stronger and with more power on the motors.

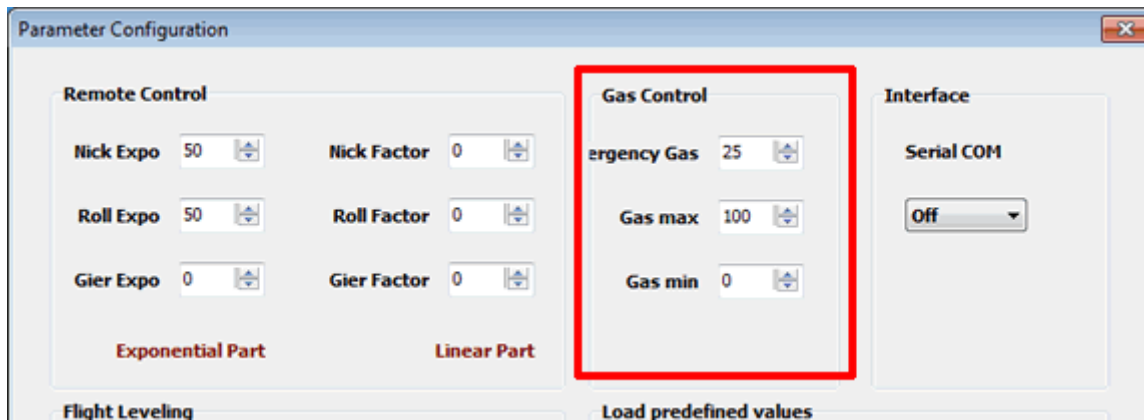
## **Angle Boundary**

To simplify the flight, especially for beginners, the pitch in the Nick/Roll axes can be limited. The limitation acts uniform on the Roll and the Nick axis. The value is relative and indicates not a specific angle. A high value allows a high steered flight angle at the Nick and Roll Axis and this means a sportive flight style. For beginners a low value is recommended which limits the flight angle to a save value.



## 5. Gas

There are three parameters responsible for the throttle control.



Picture 08: Throttle control



Values can be entered between 0 and 100 (0% and 100%).

**Emergency Gas** specifies with what gas value an emergency landing is executed. The value is dependent of the total weight of the QC1 with additional equipment. This parameter must be smaller than the gas value for hovering. An emergency landing is only initiated after a longer blackout of the radio circuit. If the radio communication is re-established with a sufficient quality, the emergency landing is aborted, and the remote control is active again.



A value of approx 35 can be used for hovering with an unloaded Quadrocopter (Type QC450-I). This is strongly depending on the exact departure weight of the Quadrocopter.

**Gas max** limits the gas value to a specific value. Since the QuadroCopter accelerates strongly with full throttle, this limitation is reasonable for first flight experiences or for the test of new parameter settings. Gas max does not limit the steering range of the position control. A value of 100 allows to use full power for the motors of the Quadrocopter.



At a value of 60 an unloaded Quadrocopter (Type QC450-I) can be reasonable flown. But this value is only suggested for beginners and strongly depending on the exact departure weight of the Quadrocopter.

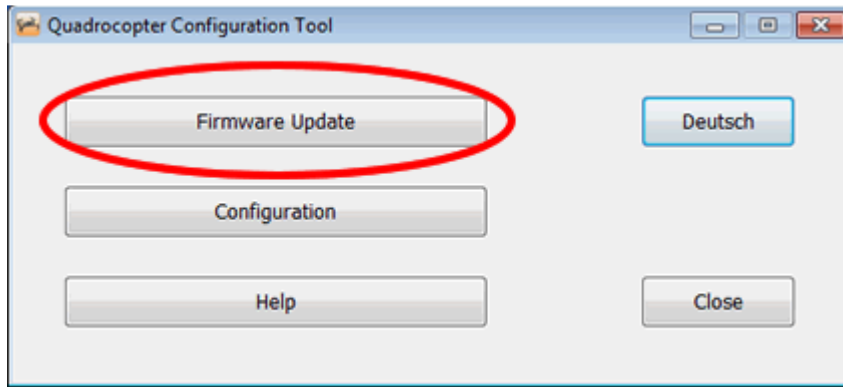
**Gas min** defines the minimal gas value. If the remote control sends a smaller value, the gas value is kept to Gas min. Brushless motors need a minimum rotational speed for safe operation. Gas min guarantees that the motor is not operated below the operational range.



The value 10 reflects the lower idle speed of the Type QC450-I Quadrocopter. The value can be higher for bigger motors.

## 6. Firmware Update

After the program start a firmware update can be done to the Quadrocopter.



Picture 09: Main window of the configuration tool

The interface has to be configured properly before a firmware update!  
Please refer to [General Configuration](#)

To start the firmware update click on the button "Firmware Update". Then select the suitable firmware file and confirm with "OK". A progress bar informs you about the status of the update.



**Don't disconnect the interface cable during a firmware update. This can result in unexpected setting or damages on the hardware of the Quadrocopter!**